

Patent Claims

1. A device for the detection of substrates stacked with a specific spacing at an opening of a wall element with a closure for the opening, it being possible for this closure to be adjusted in at least two different directions relative to the wall element by means of a drive mechanism that is positioned below the opening and having a transmitting and receiving device for transmitting and receiving a horizontally directed measuring beam, characterized in that the transmitting and receiving device (11) consists of a vertical drive mechanism (10) mounted on the wall element (1) and a sensor head (13) that can be adjusted between a lower and an upper position by means of the vertical drive mechanism (10), said sensor head being pivoted on the vertical drive mechanism (10) so that it can pivot into the opening (4).
2. The device according to claim 1, further characterized in that the vertical drive mechanism (10) is mounted below the opening (4) and outside of the region of movement of the closure (6) on the wall element (1).
3. The device according to claim 2, further characterized in that the vertical drive mechanism (10) supports the sensor head (13) on a pivoting head (18) that has a horizontally directed pivot axis (S-S) and is mounted on an arm (12) that can be extended vertically.
4. The device according to claim 3, further characterized in that the pivot axis (S-S) runs through a hollow shaft (19), on which the sensor head (13) is placed and which can pivot between two terminal positions.

5. The device according to one of claims 1 to 4, further characterized in that the sensor head (13) is designed as a forked light barrier, in which, at one end of the fork (25), a transmitter (26) is mounted for emitting a measuring beam directed along a measuring beam path (M-M) towards the other end of the fork (28) and, at the other end of the fork (28), there is provided a beam deflection device, from which a coupled optical fiber (31) leads outside of the measuring beam pathway (M-M) by means of optics to a receiver (32) at the first end of the fork (25) in a lighttight manner.
6. The device according to claim 5, further characterized in that the forked light barrier is arranged so as to pivot around a horizontally directed pivot axis (S-S), which runs parallel to and at a spacing from the measuring beam path (M-M), so that the ends of the fork (25, 28) pass through the opening (4) in the wall element (1) when pivoting occurs around the pivot axis (S-S).
7. The device according to claim 6, further characterized in that the transmitter (26) is designed as a laser.
8. The device according to one of claims 1 to 7, further characterized in that the transmitting and receiving device (11) is equipped with its own electronic control and analysis unit, which is connected to a bus system of a central logic control.
9. The device according to claim 8, further characterized in that the vertical drive mechanism (10) is constructed as a motor-spindle combination, which has an encoder for identifying the vertical positions, the encoder being linked to the electronic control and analysis unit of the transmitting and receiving device (11), the measured signals obtained from the receiver (32) thereby being assigned to the positions determined.

10. The device according to one of claims 1 to 4, further characterized in that the sensor head is designed as a reflection measuring device, in which the transmitter and receiver are arranged next to each other on the sensor head.